

REMARKS

Reconsideration and allowance of this application is respectfully. By this Amendment, Applicant has amended the specification, and amended claims 5, 7-11, 25, 27-29, 31-33, 36-46, 60-67 and 69. The specification is amended to correct typographical errors. Claims 5, 7-11, 25, 27-29, 31-33, 36-46, 60-67 and 69 are amended to address informalities and to clarify the claim language, but not for any reasons regarding the patentability of the recited subject matter. Claims 1-75 remain pending in this application, of which claims 12-24, 47-59 and 72 are withdrawn from consideration.

In the Office Action, the Office rejected claims 7 and 8 under 35 U.S.C. § 112, second paragraph for allegedly being indefinite; rejected claims 71 and 73-75 under 35 U.S.C. § 101 for allegedly reciting non-statutory subject matter; rejected claims 1, 3-7, 25-27, 29-30, 36, 38-42 and 60-64 as allegedly being anticipated by U.S. Patent 6,219,464 to *Greggain et al.* ("*Greggain*"); rejected claims 71 and 73-74 under 35 U.S.C. § 103(a) as allegedly not being patentable over *Greggain*; rejected claims 2, 11, 37 and 46 under 5 U.S.C. § 103(a) as allegedly not being patentable over *Greggain* in view of U.S. Patent No. 5,894,329 to *Takeda et al.* ("*Takeda*"); rejected claims 8, 31, 43 and 65 under 35 U.S.C. § 103(a) as allegedly not being patentable over *Greggain* in view of U.S. Patent No. 6,836,572 to *Ma et al.* ("*Ma*"); and rejected claims 10, 33, 45 68 and 75 under 35 U.S.C. § 103(a) as allegedly not being patentable over *Greggain* in view of *Ma* and US. Patent No. 6,262773 to *Westerman*. Applicant respectfully traverses these rejections for the reasons stated below.

Rejection of Claims 7 & 8 Under
35 U.S.C. § 112, Second Paragraph

Applicant has amended claims 7 and 8 to address the issues raised by the Office. (Office Action, pp. 2-3, ¶¶ 2-4.) Applicant therefore respectfully requests that the Office withdraw the rejection of claims 7 and 8 under Section 112.

Claims 31, 42, 43, 64 and 65 recite similar subject matter to that recited in claims 7 or 8. Accordingly, Applicant has also amended claims 31, 42, 43, 64 and 65 to obviate a potential rejection under Section 112 for similar reasons as given for claims 7 and 8.

Rejection Under 35 U.S.C. § 101

The Office rejected claims 71 and 73-75 under Section 101 for reciting a computer-readable medium that allegedly could be interpreted as including intangible carrier wave. (Office Action, pp. 3-4.) Claims 71 and 73-75 have been amended to recite "a tangible computer-readable medium." In light of this change, Applicant requests that the Office reconsider and withdraw the rejection under 35 U.S.C. § 101.

Rejection of Claims 1, 3-7, 25-27, 29-30, 36, 38-42 and 60-64
Under 35 U.S.C. § 102(b)

In order to properly anticipate Applicant's claims 1, 3-7, 25-27, 29-30, 36, 38-42 and 60-64 under Section 102(b), each and every element of the claim in issue must be found, either expressly described or under the principles of inherency, in a single prior art reference. (See M.P.E.P. § 2131 (8th Ed., rev. Aug. 2006.)) Further, the identical invention must be shown in as complete detail as contained in the claim. (*Id.*, emphasis added) *Greggain* fails in this regard.

Greggain discloses a method for providing an enlarged video image by generating an "upsampled" target pixel between the lines and pixels of a digital source data. (*Greggain*, cols. 1:9-13, 4:61-64.) The method includes (1) calculating the difference in values of pixels of the digital source data, (2) selecting an interpolation direction; (3) interpolating between selected pixels of the digital source data; and (4) generating an upsampled target pixel. (*Id.* at col. 5:11-25, emphasis added.) In other words, *Greggain* discloses enlarging an image by generating a new pixel based on based on pixels included in the digital source data.

The Office apparently asserts that the upsampled target pixel disclosed by *Greggain* corresponds to Applicant's claimed "input pixel." (Office Action, p. 5.) Applicant respectfully disagrees. Applicant's independent claim 1 recites "[an] apparatus for enhancing the quality of reproduced images" that "determines whether or not an edge included in an input pixel belongs to a vertical area" and "calculates an interpolated pixel value for the input pixel" (emphasis added).

Because the method disclosed by *Greggain* generates (i.e., outputs) an upsampled target pixel, the upsampled target pixel cannot be considered to correspond to Applicant's claimed "input pixel." Thus, *Greggain* does not to disclose or suggest, "determin[ing] whether or not an edge included in an input pixel belongs to a vertical area" and "calculat[ing] an interpolated pixel value for the input pixel" (emphasis added). Accordingly, *Greggain* cannot support a rejection of claim 1 under 35 U.S.C. § 102(b). Claim 1 is, therefore, allowable over *Greggain* and claims 3-7 are also allowable at least due to their dependence from independent claim 1.

Independent claims 25, 36 and 60, although of different scope than claim 1, recite subject matter similar to that recited in claim 1. For instance, each of claims

25, 36 and 60 recite an "input pixel." Accordingly, claims 25, 36 and 60 are allowable over *Greggain* for similar reasons to those set forth above with regard to claim 1. Claims 26, 27, 29, 30, 38-42 and 61-64 are allowable at least due to their corresponding dependence from claims 25, 36 and 60.

Rejections of Claims 71, 73 and 74
Under 35 U.S.C. § 103(a)

Applicant respectfully traverses the rejection of claims 71, 73 and 74 under 35 U.S.C. § 103(a) as being unpatentable over *Greggain* because the reference fails to disclose or suggest every feature recited in Applicant's claims. In particular, claims 71, 73 and 74 include the subject matter of claims 36, 60 and 61, respectively. As already noted above, *Greggain* fails to disclose or suggest, at least, an "input pixel," as recited in claims 36, 60 and 61. Thus, *Greggain* also does not disclose the same feature of claims 71, 73 and 74. Accordingly, *Greggain* cannot support a rejection of claims 71, 73 and 74 under 35 U.S.C. § 103(a).

Rejections of Claims 2, 11, 37 and 46
Under 35 U.S.C. § 103(a)

Claim 2 depends from claim 1 and, therefore, includes all the limitations of claim 1. As noted above with regard to claim 1, *Greggain* does not disclose or suggest, "determin[ing] whether or not an edge included in an input pixel belongs to a vertical area" and "calculat[ing] an interpolated pixel value for the input pixel," as recited in claim 1. Accordingly, *Greggain* also fails to disclose or suggest the same feature in claim 2. In addition, the Office concedes that *Greggain* fails to disclose or suggest "compar[ing] the interpolated pixel value with an original input pixel value

and adjust[ing] the interpolated pixel value based on the comparison result," as recited in Applicant's claim 2.

Takeda does not overcome the deficiencies of *Greggain*. *Takeda* discloses a system for converting non-interlaced images into interlaced images. (*Takeda*, col. 1:19-23.) The Office relies on *Takeda* for its alleged disclosure of comparing a pixel of a previous scan line with an interpolated pixel. (Office Action, p. 13:9-11.) To the contrary, *Takeda* performs an interpolation based on a comparison of scan lines, wherein a current scan line is compared with a previous scan line. (*Takeda*, col. 3:60-4:7.) *Takeda*, however, says nothing with regard to "compar[ing] the interpolated pixel value with an original input pixel value" as recited in Applicant's claim 2. Thus, claim 2 is allowable over the purported combination of *Greggain* and *Takeda*. Claim 11 is also allowable at least due to its dependence from claim 2.

Claims 37 and 46 recite limitations similar to those recited in claim 2 and 11, respectively. Accordingly, the applied reference cannot support a rejection of claims 37 and 46 for similar reasons as those provided above with regard to claims 2 and 11.

Rejections of Claims 8, 31, 43 and 65
Under 35 U.S.C. § 103(a)

The purported combination of *Greggain* and *Ma* cannot support a rejection of claim 8 under 35 U.S.C. § 103(a) because the references do not disclose or suggest each and every feature recited. (See M.P.E.P. § 2143)

Claim 8 recites, *inter alia*:

the direction estimator estimates the slant line to extend along a direction indicated by a minimum among (b), (c), (E), and (F) when:

a difference $(a - c)$ or $(a - E)$ or a difference $(a - b)$ or $(a - F)$
is greater than a predetermined threshold value,
(c) and (E) are greater than or smaller than (b) and (F),
respectively, and
 $|c - E|$ or $|b - F|$ is not greater than a predetermined
threshold value (emphasis added).

The Office asserts that *Greggain* teaches "thresholding differences between the absolute value of opposite pixels." (Office Action, p. 10:9-11.) The Office concedes that *Greggain* fails to teach the aforementioned method for a set of three pixels. (*Id.* at 11-12.) In order to cure *Greggain*'s deficiencies, the Office cites *Ma* for its alleged disclosure of using a set of eight pixel difference having an interpolation direction. (Office Action, p. 12-14.)

However neither *Greggain* nor *Ma* discloses "the direction estimator estimates the slant line to extend along a direction indicated by a minimum among (b), (c), (E), and (F)" based each of the three conditions recited in claim 8. Accordingly, the applied references cannot support a rejection of claim 8 under 35 U.S.C. § 103(a).

Claims 31, 43 and 65 recite limitations similar to those recited in claim 8. Accordingly, the applied reference cannot support a rejection of claims 31, 43 and 65 for similar reasons as those provided above with regard to claim 8.

Rejections of Claims 10, 33, 45, 68 and 75
Under 35 U.S.C. § 103(a)

The purported combination of *Greggain*, *Ma* and *Westerman* cannot support a rejection of claim 10 under 35 U.S.C. § 103(a) because the references do not disclose or suggest each and every feature recited in claim 10.

Claim 10 recites, *inter alia*:

the interpolation unit obtains the interpolated pixel value using values of upper three cells and lower three pixels with respect to the input

pixel, which belong to the same row as the input pixel but different columns from one another when the edge included in the input pixel is determined to belong to the vertical area, and

the interpolation unit obtains the interpolated pixel value using the values of four pixels diagonally adjacent to the input pixel when the edge included in the input pixel is determined to belong to the slant line area (emphasis added).

The Office asserts that *Greggain* teaches "thresholding differences between the absolute value of opposite pixels." (Office Action, p. 10:9-11.) The Office, however, concedes that *Greggain* fails to teach the aforementioned method for a set of three pixels. (*Id.* at 11-12.) In order to cure *Greggain's* deficiencies, the Office cites *Ma* for its alleged disclosure of using a set of eight pixel difference having an interpolation direction and *Westerman* for its alleged disclosure of interpolation using four or more pixels. (Office Action, p. 11-12, ¶ 6). However, neither *Greggain*, *Ma* nor *Westerman* discloses "obtain[ing] the interpolated pixel value" based on the two conditions recited in claim 10. Accordingly, the applied references cannot support a rejection of claim 10 under 35 U.S.C. § 103(a).

Claims 33, 45, 68 and 75 recite limitations similar to those recited in claim 10. Accordingly, the applied reference cannot support a rejection of claims 33,45, 68 and 75 for similar reasons as those provided above with regard to claim 10.

Conclusion

For the reasons set forth above, Applicant respectfully requests allowance of the pending claims.

It is believed that this Amendment does not require additional fees. However, if additional fees are required for any reason, please charge Deposit Account No. 02-4800 the necessary amount.

In the event that there are any questions concerning this paper, or the application in general, the Office is respectfully urged to telephone Applicant's undersigned representative so that prosecution of the application may be expedited.

Respectfully submitted,

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